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FILE 'CAPLUS' ENTERED AT 14:27:12 ON 04 AUG 2003

L1 59 (FAT? OR OIL?) (S) (NMR OR (NUCLEAR(2W) SPECTR?))(S) (DRY? OR DRI?)

> d l1 ibib abs 10, 14, 16, 17, 18, 25, 29-31, 38, 39, 41-59

L1 ANSWER 10 OF 59 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 2000:759796 CAPLUS

DOCUMENT NUMBER: 134:41281

TITLE: "Low-field ¹H nuclear magnetic resonance and chemometrics combined for simultaneous determination of water, oil, and protein contents in oilseeds"

AUTHOR(S): *Pedersen, Henrik Toft; Munck, Lars; Engelsen, Soren Balling*

CORPORATE SOURCE: Food Technology, The Royal Veterinary and Agricultural University, Frederiksberg C, DK-1958, Den.

SOURCE: **Journal of the American Oil Chemists' Society** (2000), 77(10), 1069-1076

CODEN: JAOCA7; ISSN: 0003-021X

PUBLISHER: AOCS Press

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Prediction of the content of water, oil, and protein in rape and mustard seed was examd. by a combination of low-field ¹H NMR (LF-NMR) and chemometrics, enabling utilization of the entire relaxation curves in the data evaluation. To increase the range of relative contents, the untreated seeds were wetted and dried; each treatment was followed by NMR anal. The chemometric results are compared to traditional evaluation by multi-exponential fitting of the relaxation curves. For this purpose, a new Jack Knife validation procedure was developed to evaluate the no. of exponential components objectively. Classification of the 2 kinds of seeds was easily performed by LF-NMR. Partial least squares regression to oil content in untreated rape and mustard seed yielded models with correlation coeffs. of $r = 0.88$ and 0.89 with root mean square error of cross-validation (RMSECV) of 0.84 and 0.45 , resp. The rapeseed model was based on one component, whereas the mustard seed model was based on 2 components. If the seeds were dried, the predictive performance improved to $r = 0.98$ and $RMSECV = 0.36$ for rapeseed and to $r = 0.95$ and $RMSECV = 0.38$ for mustard seed. Upon drying, prediction of protein content in mustard seed improved, whereas the prediction of protein for rapeseed deteriorated. Global models, including the combination of untreated, wet, and dry seeds, all resulted in a robust and good predictive performance with RMSECV in the range 0.8 - 1.3% to water, oil, and protein content. It was demonstrated that drying the seeds to simultaneously det. water and oil content was not necessary when chemometrics was applied on the relaxation curves.

REFERENCE COUNT: 27

L1 ANSWER 14 OF 59 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 1997:722112 CAPLUS

DOCUMENT NUMBER: 128:1968

TITLE: "Study of water and oil bodies in seeds by nuclear magnetic resonance"

AUTHOR(S): *Pouliquen, Daniel; Gross, Dieter; Lehmann, Volker; Ducournau, Sylvie; Demilly, Didier; Lechappe, Joel*

CORPORATE SOURCE: Lab. de Biophysique, Faculte de Medecine, 1, rue
Haute-de-Reculée, Angers, 49045, Fr.

SOURCE: **Comptes Rendus de l'Academie des Sciences, Serie III: Sciences de la Vie (1997), 320(2), 131-138**

CODEN: CRASEV; ISSN: 0764-4469

PUBLISHER: Elsevier

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Two techniques of NMR were used for the study of water and lipid reserves in seeds. The temp. dependence of T1 relaxation time helps to identify differences in the thermodyn. properties of water between dry and germinating seeds. Among the species studied, T2 measurements distinguish two categories of seeds: pea, maize and wheat for which two components of T2 are obsd., and lettuce, tomato and radish which present one single component. The main short component is attributed to water whereas the long one is attributed to lipids from oil bodies. Images of two dry seeds, one of pea and the other of radish, show marked differences in the distribution of NMR signal intensity, suggestive of differences in distribution of oil bodies.

REFERENCE COUNT: 23

L1 ANSWER 16 OF 59 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 1996:114751 CAPLUS

DOCUMENT NUMBER: 124:173814

TITLE: "Rapid moisture and fat determination by pulsed NMR for monitoring drying and coating processes of extrudates"

AUTHOR(S): *Davenel, Armel; Marchal, Philippe*

CORPORATE SOURCE: Technology Div., Dep. Agric. Food Eng., Rennes, Fr.

SOURCE: International Journal of Food Science and Technology (1995), 30(5), 655-62

CODEN: IJFTEZ; ISSN: 0950-5423

PUBLISHER: Blackwell

DOCUMENT TYPE: Journal

LANGUAGE: English

AB After extrusion cooking, extrudates must be dried and are often coated by spraying with fatty materials before cooling and packaging. As a means to control the drying and coating processes of pet foods, a rapid NMR method was developed to det. water and fat contents over a large temp. range without weighing, heating or measuring the temp. of the samples. Weighing was avoided by normalizing all NMR intensities by the solid echo max. of each sample. Formulas using ests. of the transverse relaxation time and the concn. of liq. fat protons were used to det. total fat and moisture contents without measuring the temp. of the samples. Fat content estn. had a std. deviation better than 0.2% over a large solid fat index range above 20.degree.C. Water content was detd. with a std. deviation of about 0.2% at all temps. studied.

L1 ANSWER 17 OF 59 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 1995:801081 CAPLUS

DOCUMENT NUMBER: 123:196886

TITLE: "Seed oil determination without weighing and drying the seeds by combined free induction decay and spin-echo nuclear magnetic resonance signals"

AUTHOR(S): *Tiwari, P. N.; Gambhir, P. N.*

CORPORATE SOURCE: Nucl. Res. Lab., Indian Agric. Res. Inst., New Delhi, 110012, India

SOURCE: **Journal of the American Oil Chemists' Society (1995), 72(9), 1017-20**

CODEN: JAOCA7; ISSN: 0003-021X

PUBLISHER: AOCS Press

DOCUMENT TYPE: Journal

LANGUAGE: English

AB The free induction decay (FID) and echo signals in a spin-echo pulse sequence have been used for seed oil detn. without weighing and drying the seeds with NMR equipment that has a magnetic field of low homogeneity. Earlier known methods, based on use of the FID signal to det. seed oil, become inapplicable when the magnetic field homogeneity is poor, because the angular position of seed significantly affects the signal. The present method, which elegantly eliminates the angular dependence, involves sampling the FID signal at 10 .mu.s after a 90.degree. pulse and the subsequent echo signal at 100 .mu.s formed by applying a 180.degree. pulse at 50 .mu.s. Such short pulse spacing in spin-echo sequence produces almost a full oil signal. It also eliminates the effects of sample-to-sample variation in T2 and mol. diffusion on oil signal. The oil values obtained by this method are in good agreement (correlation for mustard: 0.952; linseed: 0.99; and peanut: 0.912) with the values obtained by the well established and accurate pulsed NMR method, which is based on the measurement of the FID signal of oil in dried and weighed seeds.

L1 ANSWER 18 OF 59 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 1995:557482 CAPLUS

DOCUMENT NUMBER: 123:31475

TITLE: "Rapid fat and water determination by nuclear magnetic resonance for drying and fat coating control of extrudates"

AUTHOR(S): *Davenel, A.; Marchal, P.*

CORPORATE SOURCE: Department of Agricultural and Food Engineering, Cemagref, Rennes, 35044, Fr.

SOURCE: **Developments in Food Science (1994), 36, 35-42**

CODEN: DFSCDX; ISSN: 0167-4501

DOCUMENT TYPE: Journal

LANGUAGE: English

AB With a view to controlling the drying and fat coating processes of extrudated pet foods, a rapid NMR method was developed for the detn. of moisture and fat content in large temp. ranges, without weighing and tempering samples and measuring the temp. of the samples. Formulas using ests. of the transverse relaxation time and concn. of liq. fat protons were used to det. total fat and moisture content without measuring the temp. of the samples. Added fat content estn. gave a std. deviation better than 0.2% above 20.degree.C. Water content was detd. with a std. deviation of about 0.2% of any temp.

L1 ANSWER 25 OF 59 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 1992:127050 CAPLUS

DOCUMENT NUMBER: 116:127050

TITLE: Application of NMR to food science

AUTHOR(S): Nagashima, Nobaya

CORPORATE SOURCE: Ajinomoto K. K., Japan

SOURCE: Japan Fudo Saiensu (1991), 30(8), 56-62

CODEN: JAFSAA; ISSN: 0368-1122

DOCUMENT TYPE: Journal; General Review

LANGUAGE: Japanese

AB A review with 19 refs. on the use of NMR for study of fatty acid compn. in oilseeds, of plant essential oils, of starch degree of dextrinization, of alc. fermn., of water states in food products., and of freeze-drying of food products.

L1 ANSWER 29 OF 59 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 1990:141275 CAPLUS

DOCUMENT NUMBER: 112:141275

TITLE: The use of NMR in the study of drying mechanisms in coatings

AUTHOR(S): Kennedy, Richard J.

CORPORATE SOURCE: Paint Res. Assoc., Teddington, UK

SOURCE: FATIPEC Congress (1988), Vol. IV(19th), 237-52

CODEN: FAPVAP; ISSN: 0430-2222

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Carbon-13 NMR spectroscopy was used to identify the autoxidn. products for Me linoleate, soybean oil, and alkyds.

L1 ANSWER 30 OF 59 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 1989:577641 CAPLUS

DOCUMENT NUMBER: 111:177641

TITLE: "Evaluation of a microwave-NMR method for oil sand oil-water-solids analysis"

AUTHOR(S): *Thompson, Gordon R.*

CORPORATE SOURCE: Res. Dep., Syncrude Canada Ltd., Edmonton, AB, T6C 4G3, Can.

SOURCE: **AOSTRA Journal of Research (1989), 5(2), 135-43**

CODEN: AJREEU; ISSN: 0822-2509

DOCUMENT TYPE: Journal

LANGUAGE: English

AB A new method of oil sand oil-water-solids anal. involves the detn. of water by microwave drying, followed by measurement of oil content by NMR spectroscopy. Data from the anal. of 175 samples by Express (cold MePh-iso-PrOH) extn.), extractor (hot MePh extn.), and the microwave-NMR method are compared. The microwave drying method for water detn. is satisfactory in its agreement with the extractor method (correlation coeff. 0.992) and is superior to the express water anal. method for samples contg. >10% water. This method is sep. applicable for the detn. of water in oil sand samples and for the prepn. of dry samples. The NMR oil anal. method is acceptable for

>95% of the samples for which it was tested. Samples with a high magnetic susceptibility are not suitable for anal. by this method. Those samples for which it is not suitable may be identified quickly and easily by measurement of the sample magnetic susceptibility. Correlation coeffs. between data from the 3 methods are all >0.99. The method advantages are a redn. of elapsed time by a factor of .apprx.2 and the elimination of solvent use. These are gained at the cost of a significant capital investment.

L1 ANSWER 31 OF 59 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 1988:201101 CAPLUS

DOCUMENT NUMBER: 108:201101

TITLE: "Seed proton NMR spin-grouping"

AUTHOR(S): Schreiner, L. J.; Pintar, M. M.; Blinc, R.

CORPORATE SOURCE: Dep. Phys., Univ. Waterloo, Waterloo, ON, Can.

SOURCE: JAOCS, J. Am. Oil Chem. Soc. (1988), 65(1), 106-8

CODEN: JJASDH

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Proton spin grouping (Peemoeller, H.; Pintar M., 1984) in the rotating frame allows for a distinction between oil, water, and starch protons with a resolu. which exceeds the one with the std. proton T1 or T2 oil and water sepn. expts. Hence, it has clear advantages in plant breeding programs in those situations where, because of the relatively high oil and water content, the std. NMR technique fails unless the seeds are dried artificially. This technique is just as fast as the std. technique. Spin-grouping was demonstrated with sunflower and Canola seeds and the results examd. relative to the oil, water, and starch contents.

L1 ANSWER 38 OF 59 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 1985:77350 CAPLUS

DOCUMENT NUMBER: 102:77350

TITLE: " Simultaneous determination of moisture and oil content in oilseeds by pulsed nuclear magnetic resonance"

AUTHOR(S): Gambhir, P. N.; Agarwala, A. K.

CORPORATE SOURCE: Nucl. Res. Lab., IARI, New Delhi, 110012, India

SOURCE: JAOCS, J. Am. Oil Chem. Soc. (1985), 62(1), 103-8

CODEN: JJASDH

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Pulsed NMR with a Carr-Purcell-Meiboom-Gill (CPMG) sequence was used for simultaneous detn. of moisture and oil content in rapeseed-mustard. This method involves sampling the free induction decay (FID) following 90.degree. pulse in the CPMG sequence and resolving the trace of the amplitude of the CPMG echo signals into exponentially decaying liq. components of oilseeds. The data show that water in oilseeds generally exists in 2 phases and the relatively slow decaying component disappears around a moisture content of .ltoreq.7%. The moisture and oil contents were detd. by the method for 34 samples of 5 different varieties of seeds at varying moisture levels (.apprx.3-22%). The measured moisture and oil contents were compared with the values

obtained by the oven drying method and earlier known FID method of pulsed NMR, resp., and the agreement is fairly good for rapid estn. with std. deviation of 0.70% for oil content and 0.99% for moisture content. This is a rapid and nondestructive method for detn. of both moisture and oil content without weighing and drying the seeds and also seems suitable for other matrix samples.

L1 ANSWER 39 OF 59 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 1983:590930 CAPLUS

DOCUMENT NUMBER: 99:190930

TITLE: "The use of low resolution nuclear magnetic resonance for determining avocado maturity by oil content"

AUTHOR(S): *Barry, G. A.; Brown, B. I.; Barker, L. R.*

CORPORATE SOURCE: Agric. Chem. Branch, Dep. Primary Ind., Indooroopilly, Australia

SOURCE: **Journal of Food Technology (1983), 18(4), 401-10**

CODEN: JFOTAP; ISSN: 0022-1163

DOCUMENT TYPE: Journal

LANGUAGE: English

AB A method for detg. oil content of dried avocado flesh using a low resolu. NMR spectrometer is described. Forty samples were analyzed for oil content by NMR, Soxhlet extn., and refractive index (RI) methods. Percentage of oil by NMR was more closely correlated with Soxhlet extd. oil than was percentage of oil detd. by a RI method. Data from .apprx.700 avocado samples showed that percentage of oil detd. by NMR was better correlated with percentage of dry matter than was percentage of oil detd. by RI. The relations between dry matter and oil were far more consistent between seasons for the NMR method than for the RI one. Advantages of using the NMR technique in avocados are simplicity, speed, low operator errors, and the elimination of the use of dangerous solvents. A reproducibility relative std. deviation of 0.6% was obtained.

L1 ANSWER 41 OF 59 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 1982:5009 CAPLUS

DOCUMENT NUMBER: 96:5009

TITLE: "Determination of fat content in fried potato products using NMR"

AUTHOR(S): *Putz, B. Kartoffelverarbeitung, Detmold, Fed. Rep. Ger.*

SOURCE: **Fette, Seifen, Anstrichmittel (1981), 83(10), 388-91**

CODEN: FSASAX; ISSN: 0015-038X

DOCUMENT TYPE: Journal

LANGUAGE: German

AB Fried potato samples had to be dried to .ltoreq. 3% moisture before fat detn. by NMR could be carried out. The same fat used for frying had to be used as a std. in the detn. Changes in fat quality after frying interfered with the detn. The method had a variability of 4% when carried out under optimum conditions.

L1 ANSWER 43 OF 59 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 1980:159946 CAPLUS

DOCUMENT NUMBER: 92:159946

TITLE: "Seed oil determination by pulsed nuclear magnetic resonance without weighing and drying seeds"

AUTHOR(S): *Tiwari, P. N.; Burk, W.*

CORPORATE SOURCE: Nucl. Res. Lab., Indian Agric. Res. Inst., New Delhi, India

SOURCE: **Journal of the American Oil Chemists' Society (1980), 57(3), 119-21**

CODEN: JAOCA7; ISSN: 0003-021X

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Pulsed NMR, which takes about 10 s per anal., was used for rapid nondestructive detn. of oil in oilseeds without weighing and oven drying the seeds. This was done by measuring the free induction decay signal of solid and liq. in oilseeds. The oil values detd. by this method for mustard, sunflower, and soybean seeds were compared with the values detd. by measuring the oil signal alone in the intact seeds, which takes about 2 min per anal. Correlation for mustard were 0.988, for sunflower 0.945, and for soybean 0.931. The reasons for better agreement for mustard and the way of improving it for sunflower and soybean have been discussed.

L1 ANSWER 44 OF 59 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 1980:143438 CAPLUS

DOCUMENT NUMBER: 92:143438

TITLE: "Single corn kernel wide-line NMR oil analysis for breeding purpose"

AUTHOR(S): *Wilmers, M. C. C.; Rettori, C.; Vargas, H.; Barberis, G. E.; Da Silva, W. J.*

CORPORATE SOURCE: Inst. Fis. Gleb Wataghin, Univ. Estadual Campinas, Campinas, 13100, Brazil

SOURCE: **Revista Brasileira de Fisica (1978), 8(3), 562-75**

CODEN: RBFSA3; ISSN: 0374-4922

DOCUMENT TYPE: Journal

LANGUAGE: English

AB In wide-line NMR expts. detg. the oil content in single corn seeds having .apprx. 10% moisture or artificially dried to .apprx. 5% moisture, the non-dried seeds NMR spectra clearly demonstrated the presence of 3 resonances with different radio frequency satn. factors. For dried seeds, the oil concn. detd. by NMR was highly correlated ($r = 0.997$) with that detd. by a gravimetric method. The highest discrepancy between the 2 methods was .apprx. 1.3%. When relative measurements are required, as in the case of a single kernel for a recurrent selection program, precision in the individual selected kernel will be .apprx. 2.5%. Using this technique, a first cycle of recurrent selection using S1 lines for low and high oil content was performed in an open-pollinated variety. Gain from selection was 12.0 and 14.1% in the populations for high and low oil contents, resp.

L1 ANSWER 46 OF 59 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 1977:437430 CAPLUS

DOCUMENT NUMBER: 87:37430

TITLE: Quantitative analysis of food products by pulsed nuclear magnetic resonance.
II. Simultaneous analysis of water and fat in milk powder and cottage cheese

AUTHOR(S): Hester, R. E.; Quine, D. E. C.
CORPORATE SOURCE: Dep. Chem., Univ. York, York, UK
SOURCE: Journal of Dairy Research (1977), 44(1), 125-30
CODEN: JDRSAN; ISSN: 0022-0299

DOCUMENT TYPE: Journal

LANGUAGE: English

AB By pulsed NMR using a small process analyzer, the water and fat contents of milk powders were detd. as 1-5 and 0.5-25% resp. with std. deviations of 0.20% and 0.64% resp. Cottage cheese samples contained water and fat in the ranges 77-81 and 2-7% resp. with std. deviations of 0.30% water and 0.16% fat. Procedures used for establishing and eliminating cross interferences in these analyses are described.

L1 ANSWER 47 OF 59 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 1976:431689 CAPLUS

DOCUMENT NUMBER: 85:31689

TITLE: "Rapid method for the NMR determination of the oil content of grains after drying in a microwave oven"

AUTHOR(S): Karleskind, A.; Valmalle, G.; Chemin, S.

CORPORATE SOURCE: Lab. Wolff, Paris, Fr.

SOURCE: **Revue Francaise des Corps Gras (1976), 23(3), 147-50**

CODEN: RFCGAE; ISSN: 0035-3000

DOCUMENT TYPE: Journal

LANGUAGE: French

AB Two primary problems in the detn. of oil in cereal grains by NMR were overcome, viz. moisture content and variation in the grains, esp. rapeseed. The sample is dried in a microwave oven under carefully controlled conditions, and oil is assayed by ref. to the fatty acid compn. of the oil. The sample (20 g) in a porcelain dish is dried 200 sec in a microwave oven equipped with plates to absorb some of the radiant energy, which otherwise would be too strong. It is then transferred to the NMR app. The response of the app. is compared to that given by a known oil similar in compn. to that of the oil in the test material. The amt. of oil in the test sample is then calcd. by ref. to the known sample.

L1 ANSWER 48 OF 59 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 1976:402107 CAPLUS

DOCUMENT NUMBER: 85:2107

TITLE: "Effect of drying conditions on oil content of sunflower (*Helianthus annuus* L.) seeds as determined by wide-line nuclear magnetic resonance (NMR)"

AUTHOR(S): Granlund, M.; Zimmerman, D. C.

CORPORATE SOURCE: Dep. Biochem., North Dakota State Univ., Fargo, ND, USA

SOURCE: **Proceedings of the North Dakota Academy of Science (1975), 27, Pt. 2, 128-32**

CODEN: PNDAAZ; ISSN: 0096-9214

DOCUMENT TYPE: Journal

LANGUAGE: English

AB The relation between sunflower seed oil content as detd. by NMR and seed moisture was studied. Random samples of 2 varieties of sunflower seed (Mingren and Peredovik) were dried at 60.degree. to retain seed vitality; the NMR reading and moisture content decreased significantly after the 24-hr treatment. Addnl. drying reduced the dry wt. but did not significantly affect the oil content as detd. by NMR. Drying could be done at 130.degree. for 1 hr with the same results. Either drying method showed the oil content of the Peredovik variety to be 49.6%.

L1 ANSWER 51 OF 59 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 1972:418163 CAPLUS

DOCUMENT NUMBER: 77:18163

TITLE: "Rapid method for the determination of the dry matter and fat content of cheese and processed cheese"

AUTHOR(S): *Moisio, Tauno; Timonen, Erkki; Kreula, Matti*

CORPORATE SOURCE: Valio Lab., Helsinki, Finland

SOURCE: **Milchwissenschaft (1972), 27(2), 73-5**

CODEN: MILCAD; ISSN: 0026-3788

DOCUMENT TYPE: Journal

LANGUAGE: English

AB A NMR method is described for the detn. of fat and dry matter content of cheese and processed cheese.